

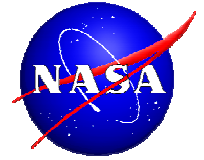
Earth Science Data and Information System (ESDIS) Project



Jeanne Behnke
DAAC Users Working Group
March 9, 2011



Earth Observing System Data and Information System (EOSDIS)

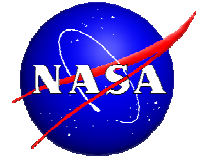


The EOSDIS is continually evolving to meet increasing workload and shorter latency requirements; leverage new information technologies; and improve support to a broad user community.

Recent improvements to the system include:

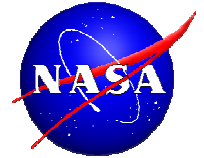
- Transition to a fully on-line data archive
- Network performance enhancements
- Functional and performance enhancements to ECHO
- Expanded near-real-time capabilities
- Increased collaboration among DAACs
- Many new science data sets

What's Up!!

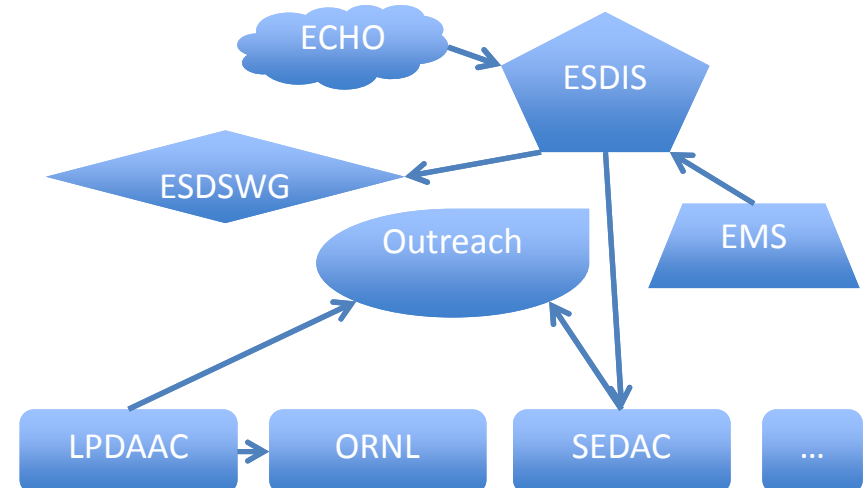
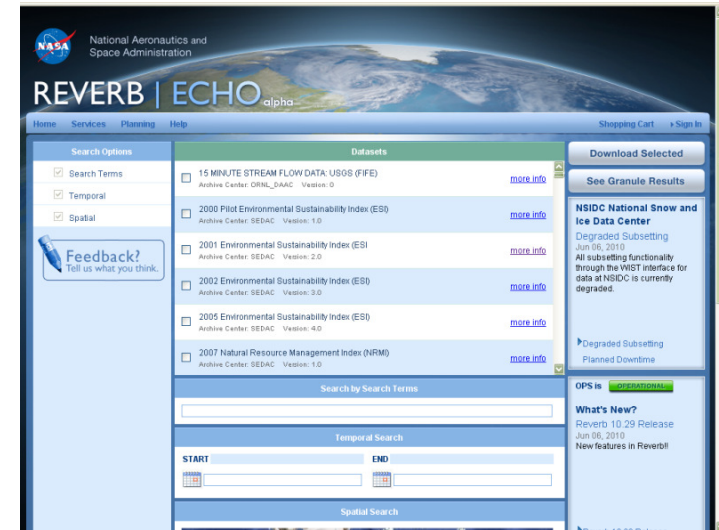


- Technology Infusion
 - Consolidated Level 2 Swath Search and Subsetting Web services
 - SAR Data Accessibility Enhancements
 - Satellite Coincident Search Engine
 - Simple Subset Wizard
- Upgrades to LANCE near real time systems and additional products
- Distribution and management of MEaSUREs datasets as they mature
- Enhanced WIST (ECHO client called Reverb) to go operational in June 2011
- Enhanced ECHO Ingest API to allow ingest of ISO 19115 & other metadata in Mar 2011
- Uniform user registration system being developed and implemented in phases across DAACs. LP DAAC will play a critical role.
- Developing a coherent Web presence for EOSDIS data services
- Advance planning science system support for NPP, Ventures, Decadal Survey missions

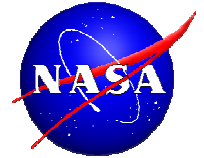
New Web Services



- Reverb, and upgraded WIST, will become the general purpose web search client for EOSDIS data
 - Beta release soon, public in June
 - Decreases turnaround speeds using a REST-type interface with ECHO
 - Access to ECHO holding 3,092 Collections, with 87 million Granules, and 57 million Browse
- Develop a coherent web presence for the Earth Science Data System Project from top-to-bottom (HQ-EOSDIS-DAACs)
 - Better represent EOSDIS capabilities
 - Have data centers more clearly represented as elements of a larger system



Access from EOSDIS Data Centers



USGS
science for a changing world

LP DAAC
LAND PROCESSES DISTRIBUTED ACTIVE ARCHIVE CENTER

USGS Home
Contact USGS
Search USGS

HOME ABOUT PRODUCTS **GET DATA** TOOLS USER COMMUNITY CUSTOMER SERVICE

Search

WIST
GloVis
Data Pool
MRTWeb
ASTER Tasking

Get Data

Get Data

NASA Warehouse Inventory Search Tool (WIST)

All LP DAAC data holdings available - Search and order earth science data from all NASA data centers - Replacement for EOSDIS Data Gateway (EDG). [More Information](#) - [Launch WIST](#)

USGS Global Visualization Viewer (GloVis)

All LP DAAC ASTER and selected MODIS data holdings available. Landsat 7 ETM+, Landsat 4/5 TM, Landsat 1-5 MSS, EO-1 ALI, EO-1 Hyperion, MRLC, and Tri-Decadal data sets also available. Browse-based for enhanced visualization. [More Information](#) - [Launch GloVis](#)

LP DAAC Data Pool

Selected LP DAAC ASTER and MODIS data holdings - Direct FTP access - All data are at no charge. [More Information](#)

Get Data

DAAC Home -> GET DATA

ORNL DAAC Distributed Active Archive Center for Biogeochemical Dynamics

About Us About Data **Get Data** Data Tools Help

home sign in search for in Metadata

Get ORNL DAAC Data Products and Services

Simple Search Tool

The simple search is the search performed by the search box atop each main Web page on this Web site. By default this search queries archived ORNL DAAC data products for user specified keyword. Optionally this tool can be used to search our Web site pages, by selecting search this site from the drop-down options on the search box.

Search for Data

The Search for data option from the "Get Data Menu" opens a metadata search system that allows users to perform a Simple Search, an Advanced Search, or a Browse Tree Search.

- Simple Search - performs a full text search of ORNL DAAC archived data products
- Advanced Search - provides options for keyword searching, and both spatial and temporal searching, and searches multiple data sources such as:
 - ORNL DAAC Archived Data
 - Land Validation Data
 - Regional and Global Data
 - Long Term Ecological Research (LTER) Network
 - Organization of Biological Field stations
- Browse Tree Search - allows users to browse directory trees for archived ORNL DAAC products, Regional and Global Data, and Land Validation Data by:
 - Data Set title
 - Parameter/Source/Site
 - Site/Sensor/Parameter
 - Topic/Term/Parameter
 - Parameter/Source/Sensor
 If you are unfamiliar with EOS data products, Browse Tree is a great way to learn about our metadata.

Get Field Campaign Data

Download Field Campaign Data:

- BOREAS and BOREAS Follow-On
- FIFE and FIFE Follow-On
- LBA
- NACP
- OTTER
- SAFARI 2000
- Superior National Forest (SNF)

Get Land Validation Project Data

Download Land Validation Data:

- Accelerated Canopy Chemistry Program (AACP)
- BigFoot
- EOS Land Validation
- FLUXNET Data Sets
- FLUXNET Web Site
- MODIS Fixed Sites (FTP)
- MODIS Fixed Sites Tool
- MODIS Global Tool
- PROVE

Get Regional and Global Data

Download Regional and Global Data:

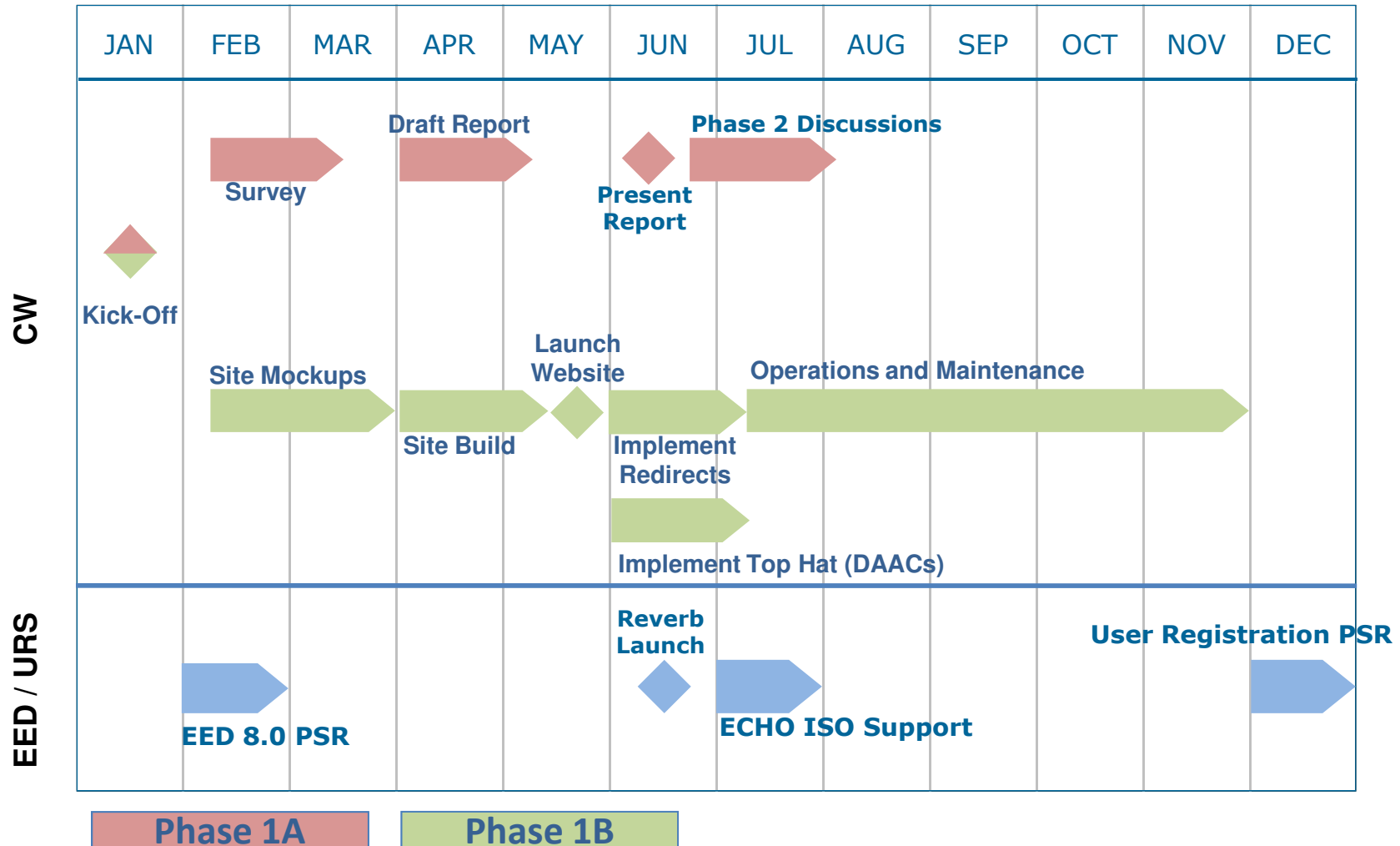
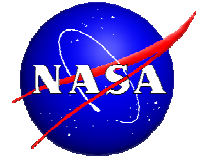
- Climate Collections
- Hydroclimatology Collections
- ISLSCP II Project
- Net Primary Productivity (NPP)
- River Discharge (RIVDIS)
- Russian Land Cover (RLC)
- Spatial Data Access Tool (SDAT)
- Soil Collections
- TransCom 3
- Vegetation Collections
- Vegetation-Ecosystem Modeling (VEMAP)

All Projects a.k.a. Product Overview

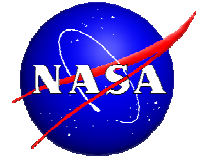
The All Projects selection from the "Get Data" tab provides a brief description of all the data projects archived at ORNL DAAC. A link is provided to list and download the data sets available within each project.

Data Access is available from the EOSDIS Data Center web sites.

Web – 2011 Timeline



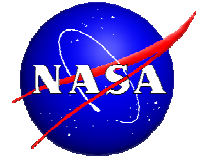
Expanding EOSDIS Near Real-time support



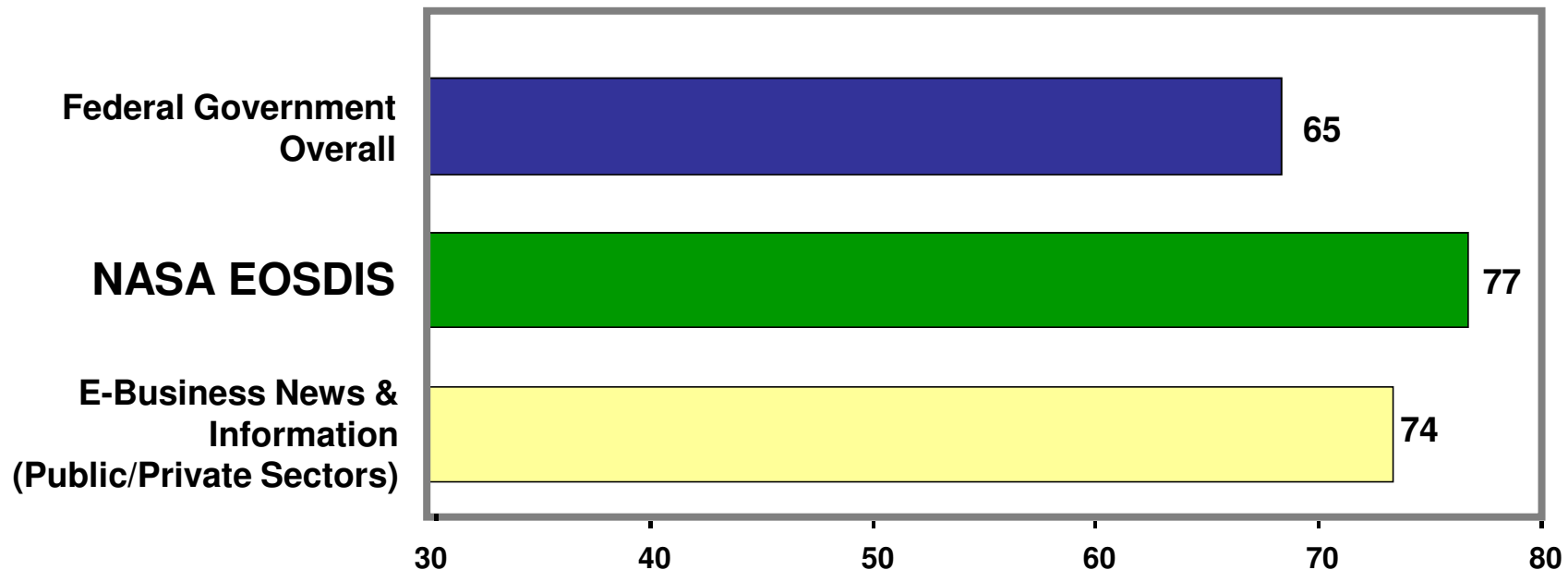
LANCE (Land, Atmosphere Near-real-time Capability for EOS)

- Builds on existing EOSDIS elements
- Data from MODIS, OMI, AIRS, MLS, and AMSR-E instruments in near real-time (< 3 hours from observation)
- 92 products available across all instruments
- High operational availability
- Applications of LANCE data include:
 - Numerical weather & climate prediction/forecasting
 - Monitoring of Natural Hazards
 - Disaster Relief
 - Agriculture
 - Air quality
 - Homeland Security
- Over 150 users access data from LANCE on a regular basis

EOSDIS ACSI Customer Satisfaction Survey 2010: Relative Rankings



- EOSDIS sponsors an annual independent customer survey in conjunction with the American Customer Satisfaction Index (ACSI).
- EOSDIS consistently exceeds the Federal Government average
- Ratings in the mid to upper 70s are considered “very good” by the rating organization, the CFI Group
- 2010 Survey results based on 4380 responses (7%)



LP DAAC showed significant increase to score 76 based on 377 responses

ORNL DAAC score also increased by one to 78 based on 185 responses

Product Quality

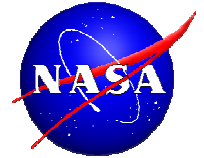
Preferences in line with actual for the most part



Format data products were provided		Format preferred	
HDF-EOS/HDF	57%	HDF-EOS/HDF	42%
NetCDF	11%	NetCDF	18%
Binary	10%	Binary	13%
ASCII	18%	ASCII	24%
GeoTIFF	36%	GeoTIFF	49%
JPEG, GIF, PNG, TIFF	14%	JPEG, GIF, PNG, TIFF	18%
OGC Web services	1%	OGC Web services	3%
GIS	8%	GIS	19%
KML, KMZ	4%	KML, KMZ	11%
CEOS	2%	CEOS	2%
Don't know	3%	OPeNDAP	2%
Other format	2%	Other preferred format	3%
Number of Respondents	4,038	Number of Respondents	4,038

**Multiple responses allowed*

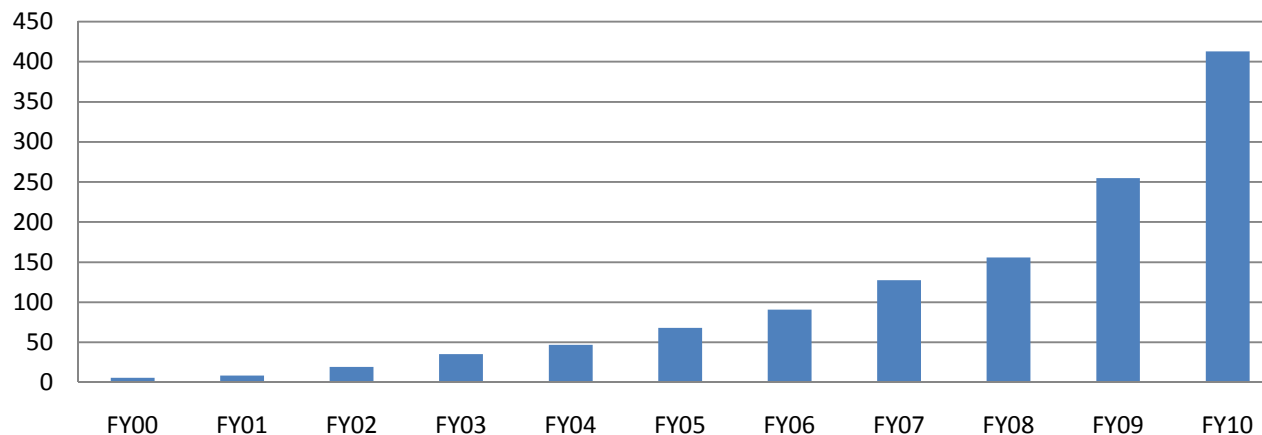
EOSDIS Key Metrics



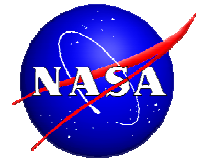
FY10 Metrics	EOSDIS	LP DAAC	ORNL
Unique Data Products	> 4200	306	923
Distinct Users of EOSDIS Data and Services	> 1.1M	~42,000	~26,000
Web Site Visits of 1 Minute or more	> 1.1M	~35,000	~18,000
Average Daily Archive Growth	2.9 TB/day	.19 TB/day	.01 TB/day
Total Archive Volume	4.5 PB	~820 TB	~0.4 TB
End User Distribution Products	> 412M	52M	50M
End User Average Daily Distribution Volume	9.9 TB/day	2.6 TB/day	0.01 TB/day

ESDIS Project Supports		
Science System Elements	Data Centers	12
	SIPS	14
Interfaces	Interface Control Documents	32
Partnerships	US	8
	International	13
Missions	Science Data Processing	10
	Archiving and Distribution	38
	Instruments Supported	87

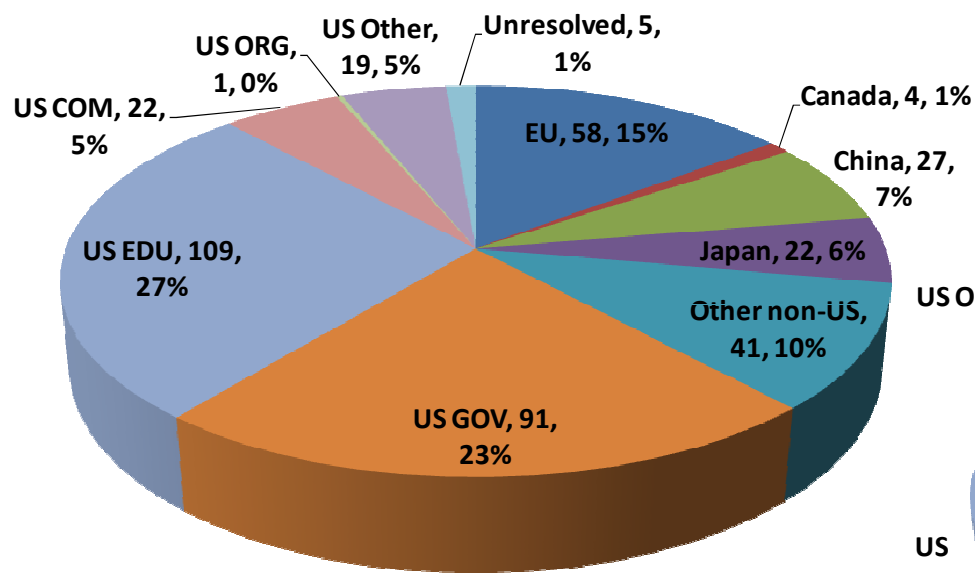
EOSDIS Products Delivered (Millions)



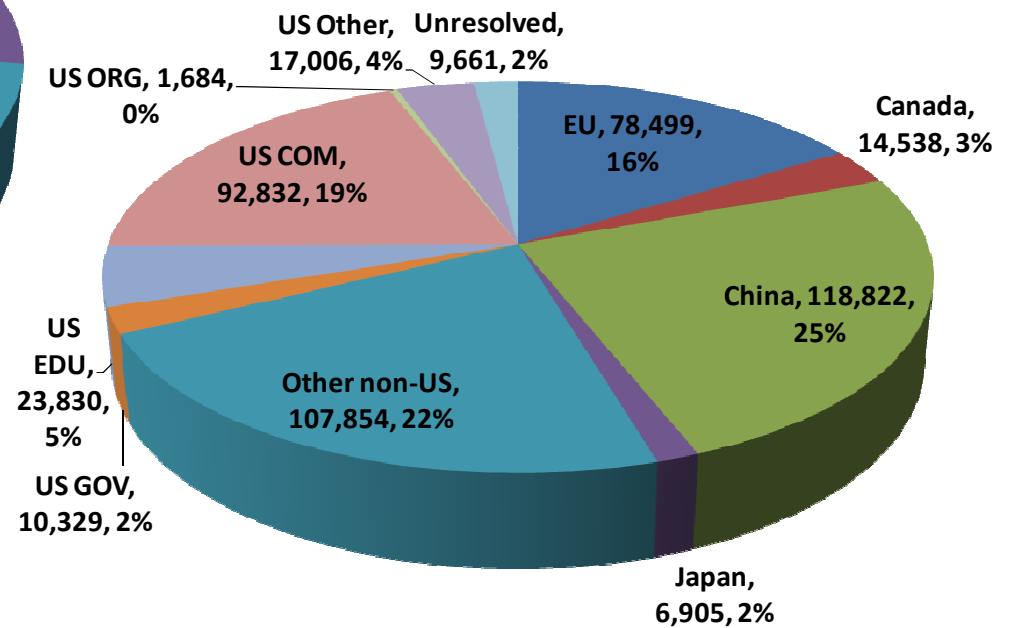
EOSDIS Data Distribution In FY2010

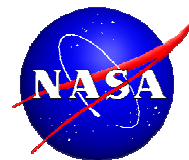


Number of Products Distributed in FY10 (Millions)



Number of Distinct Data Users in FY2010





LP DAAC Product Distribution Activity FY05/FY10

	Terra MODIS			Aqua MODIS			ASTER		
	FY05	FY10	Increase	FY05	FY10	Increase	FY05	FY10	Increase
Product Distribution (1000s)	10,512	28,606	2.7 X	1,296	19,623	15 X	429	3,310	8 X
Users	4,048	13,940	3.4 X	1,160	6,967	6 X	4,535	8,808	2 X

% MODIS	FY05	FY10
Product Distribution	89%	59%
Users	78%	67%

FY05	FY10
11%	41%
22%	33%

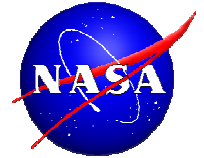
% Total	FY05	FY10
Product Distribution	70%	55%
Users	33%	45%

FY05	FY10
9%	38%
10%	22%

FY05	FY10
3%	6%
37%	28%

- **ASTER and MODIS (Terra and Aqua) show a dramatic increase in products distributed and # of data users**
- **Aqua shows an increasing percentage of the MODIS distribution**
- **LP DAAC distributed about 3M files of ASTER GDEM (ASTGTM) in both FY2009 and FY2010**

ORNL DAAC Product Distribution Activity FY05/FY10



	Terra MODIS			Aqua MODIS			Field Experiments		
	FY05	FY10	Increase	FY05	FY10	Increase	FY05	FY10	Increase
Product Distribution (1000s)	0	48,169	na	0	712	na	487	1,002	2 X
Data Users	0	4,246	na	0	1,606	na	5,406	13,281	2.5 X

% MODIS	FY05	FY10
Product Distribution	0%	99%
Data Users	0%	73%

FY05	FY10
0%	1%
0%	27%

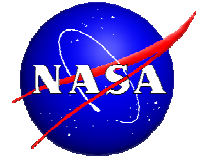
% Total	FY05	FY10
Product Distribution	0%	97%
Data Users	0%	22%

FY05	FY10
0%	1%
0%	8%

FY05	FY10
100%	2%
100%	69%

- **MODIS distribution began in FY2008**
- **Field Experiment product distribution and data users doubled since FY2005**
- **In FY2010 MODIS dominates product distribution at 98%**
 - serving 30% of the data users; 99% is MODIS Terra, 1 % is MODIS Aqua

MODIS distribution by LP DAAC and ORNL

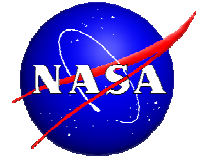


FY2010 MODIS Product Distribution

LP DAAC		ORNL	
Terra MODIS	Aqua MODIS	Terra MODIS	Aqua MODIS
22.3 GB/1K	14.6 GB/1K	.07 GB/1K	1.5GB/1K
2,000 Products/user	2,800 Products/user	11,300 Products/user	440 Products/user

- The average product size (GB) distributed by ORNL is much smaller than by LP DAAC (data subsetting)
- On average, each Terra MODIS data user at ORNL receives significantly more products

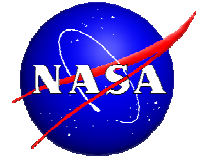
Cross DAAC data users



- From FY05 to FY10 the number of data users of both DAACs increased from 63 to 462
 - LP DAAC: from 0.8% to 2.1% of total users
 - ORNL: from 1.2% to 2.7% of total users
- Increase in cross DAAC data users coincides with ORNL MODIS data subsetting

	FY05	FY06	FY07	FY08	FY09	FY10
# of Users who retrieve data from both LP DAAC and ORNL	63	69	52	54	362	462
# of LP DAAC Users	8,309	8,619	8,996	8,295	18,345	22,168
# of ORNL Users	5,406	6,298	8,961	7,068	14,939	16,805
% of LP DAAC Users	0.8%	0.8%	0.6%	0.7%	2.0%	2.1%
% of ORNL Users	1.2%	1.1%	0.6%	0.8%	2.4%	2.7%

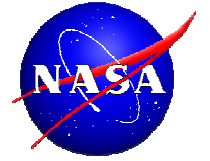
Cross DAAC activity



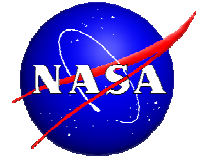
- The #1 product at LP DAAC by number of data users is MOD13 - Gridded Vegetation Indices (NDVI & EVI) [16,788 users]
 - 106 of these users also received MOD13 from ORNL
 - And 20 or more of these users accessed additional MODIS products (Terra, Aqua or combined) from ORNL:

Product	#	Description
MOD11	69	Land Surface Temperature and Emissivity
MOD15	61	Leaf Area Index (LAI) and Fractional Photosynthetically Active Radiation (FPAR)
MOD09	50	Surface Reflectance; Atmospheric Correction Algorithm Products
MOD17	40	Vegetation Production, Net Primary Productivity (NPP
MYD13	33	Aqua MODIS Enhanced Vegetation Index
MCD43	30	MODIS Bidirectional Reflectance Distribution Function (BRDF)/Albedo Product (combined)
MCD12	25	Land Cover (combined)
MYD09	20	Aqua Surface Reflectance; Atmospheric Correction Algorithm Products
MYD17	20	Aqua Vegetation Production, Net Primary Productivity (NPP

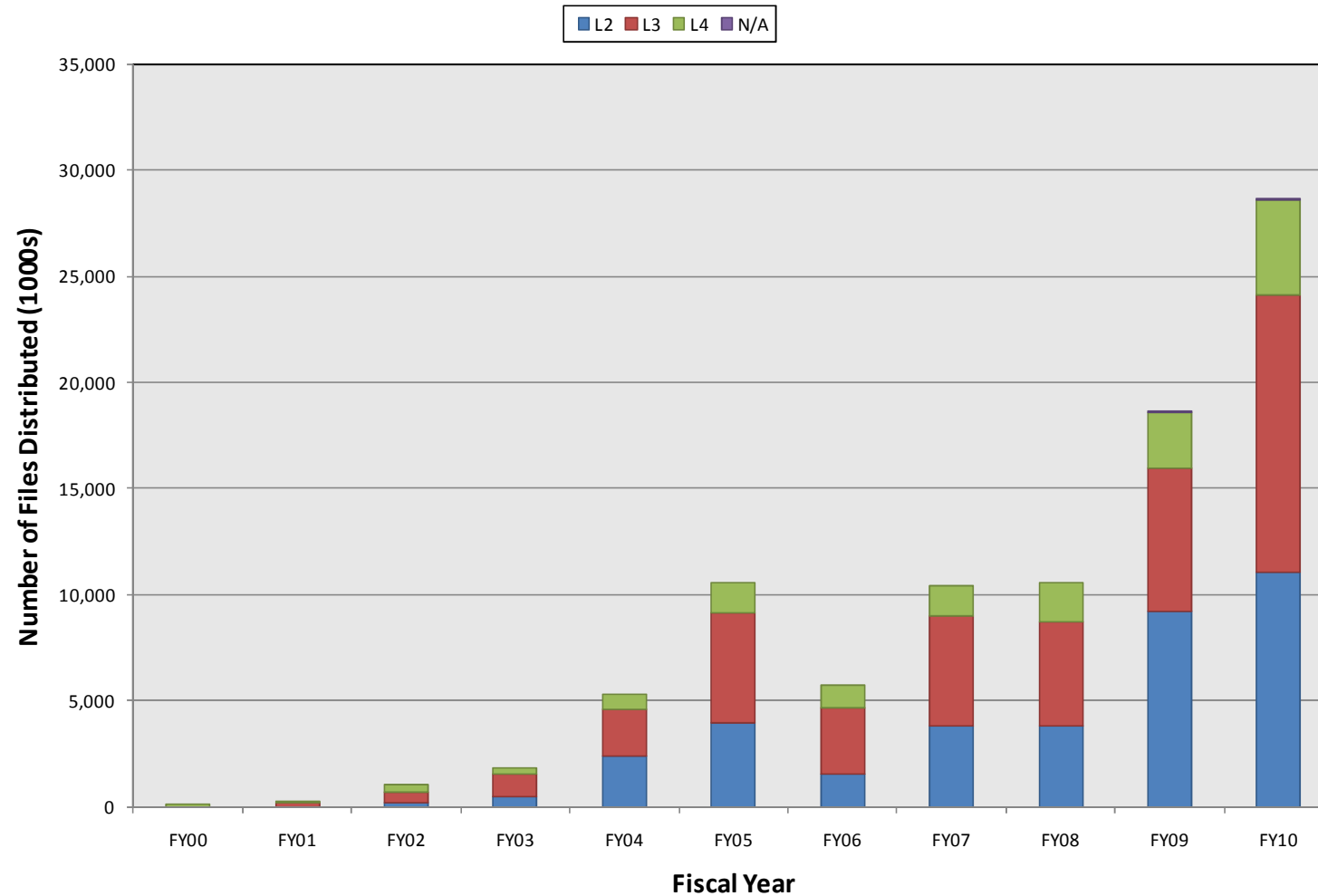
Backup



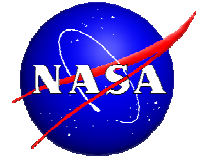
LP DAAC MODIS Distribution by Level



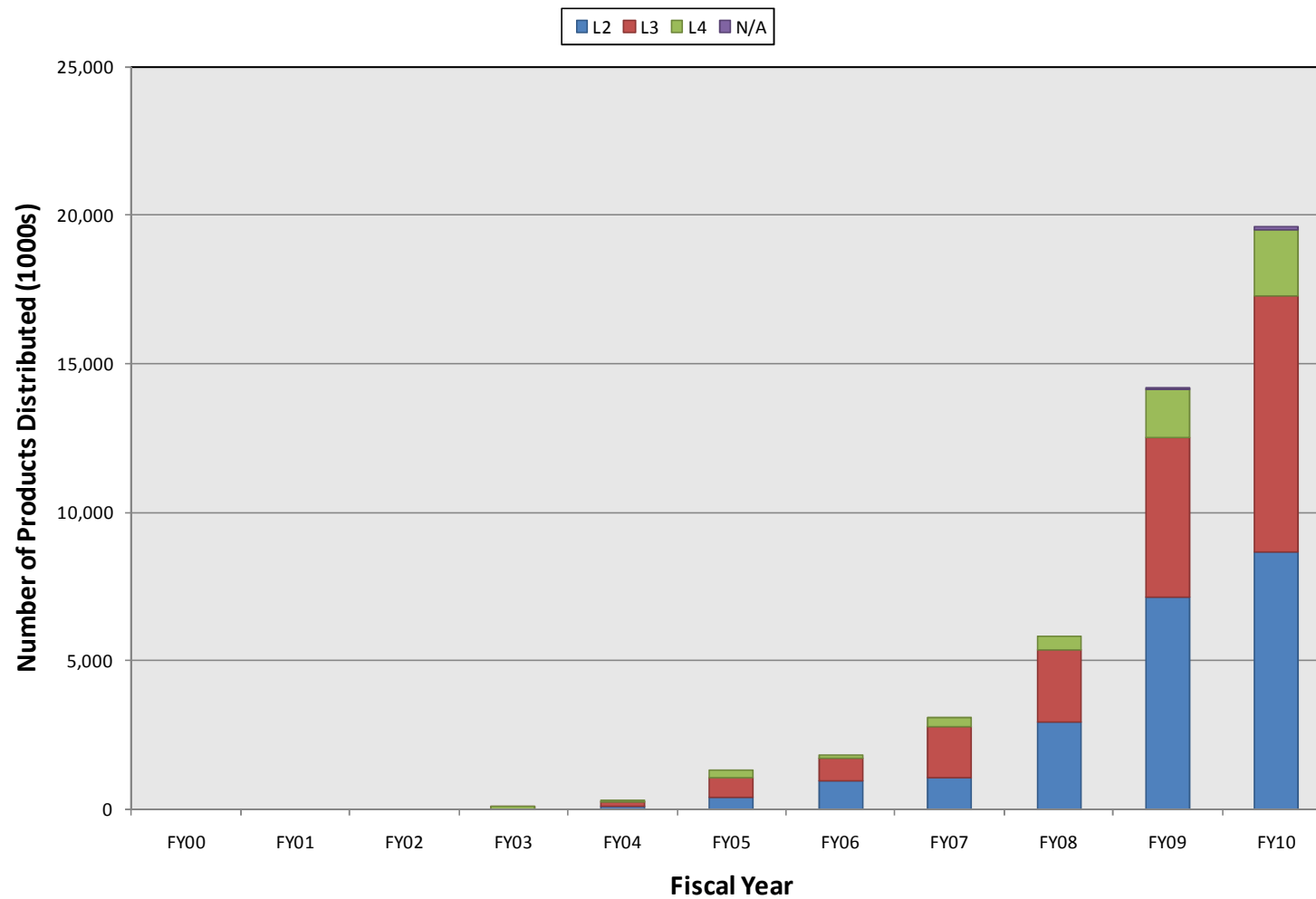
Distribution of Terra MODIS Products from LP DAAC by Level



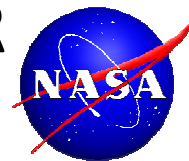
LP DAAC MODIS Distribution by Level



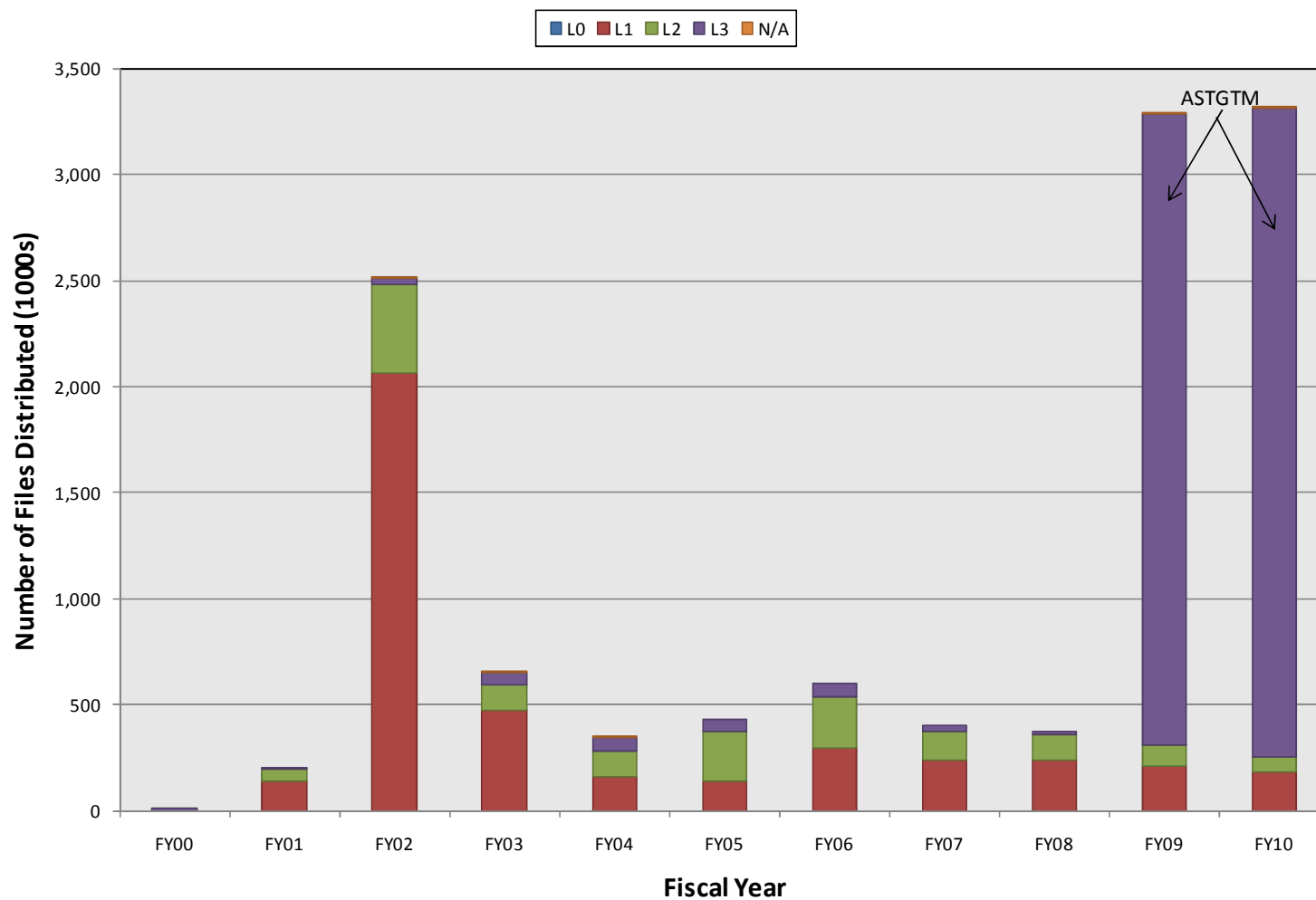
Distribution of Aqua MODIS Products from LP DAAC by Level



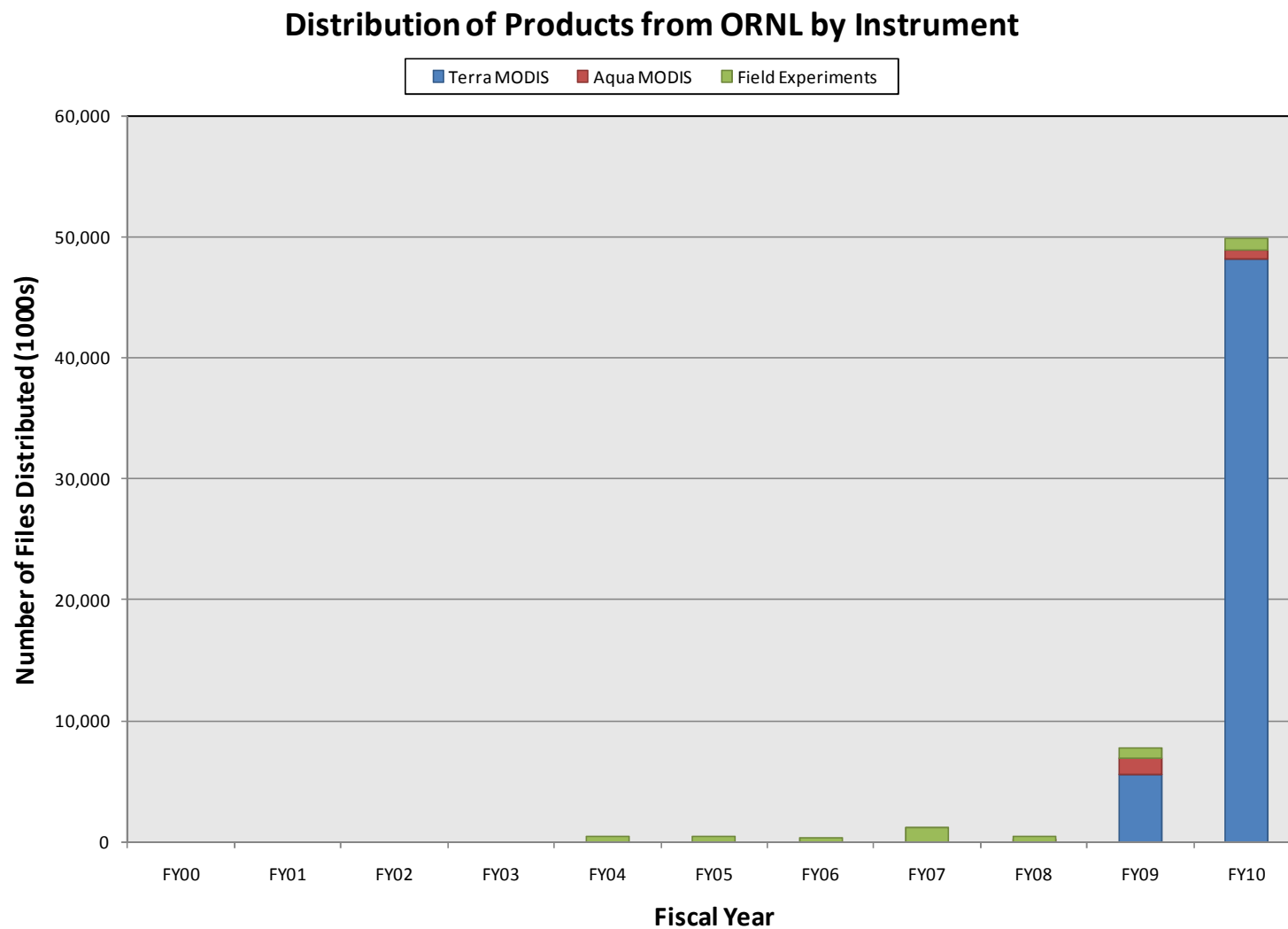
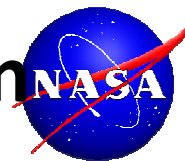
ASTER's Increase in Distribution driven by ASTER Global Digital Elevation Model (GDEM)



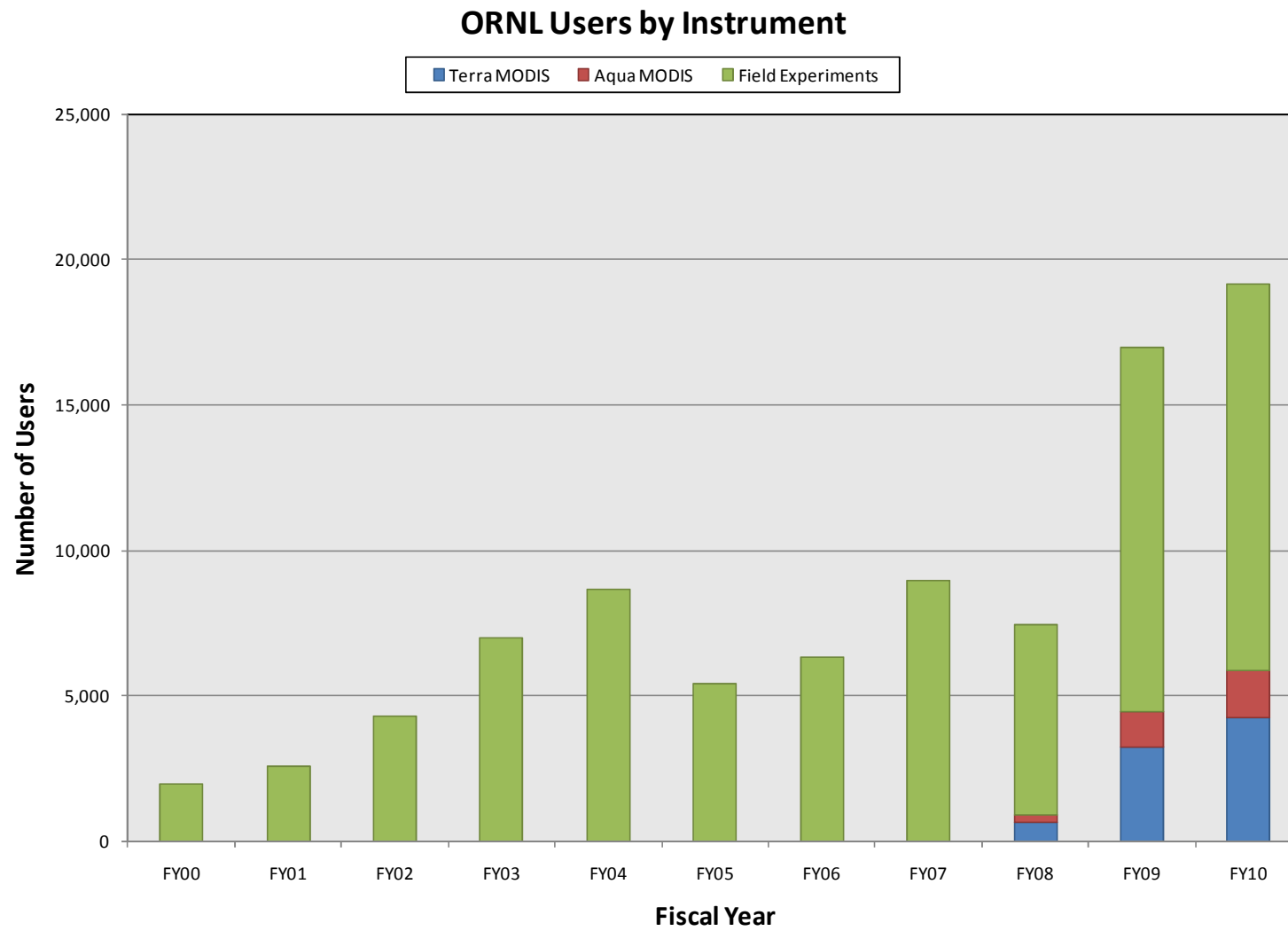
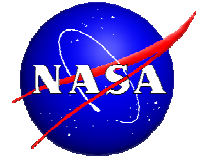
Distribution of ASTER Products from LP DAAC by Level

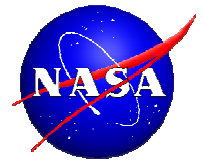


MODIS subsets bumps up ORNL distribution

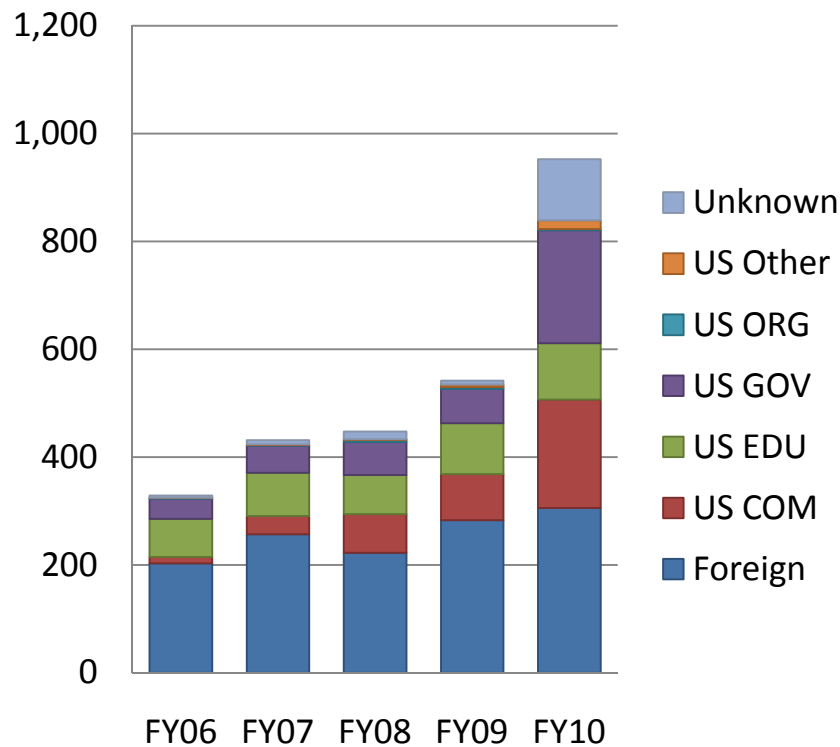


ORNL data users

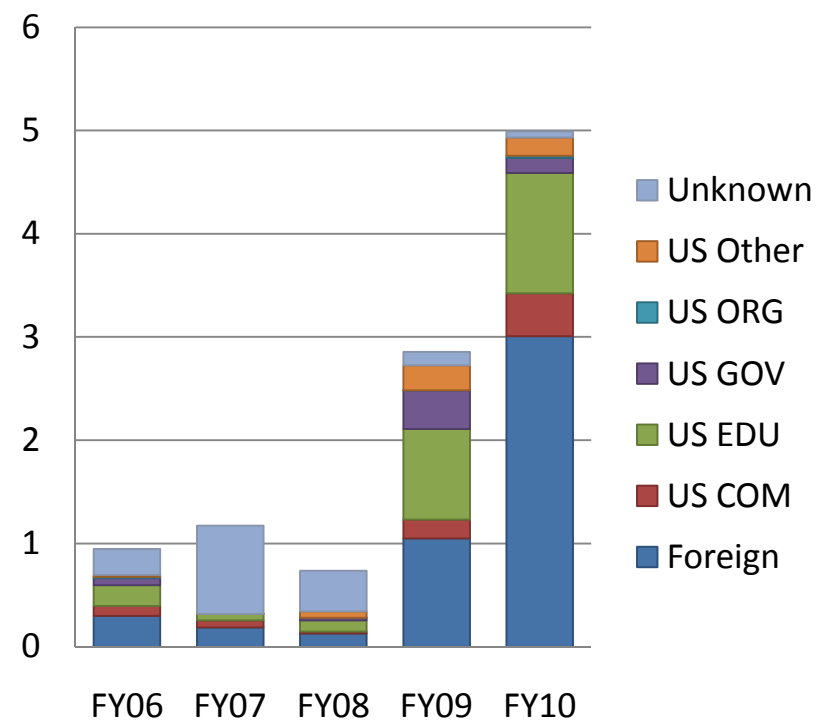


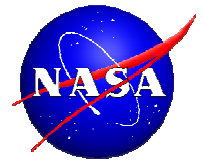


**Volume (TB) of Products
Distributed from LP DAAC
by Domain**

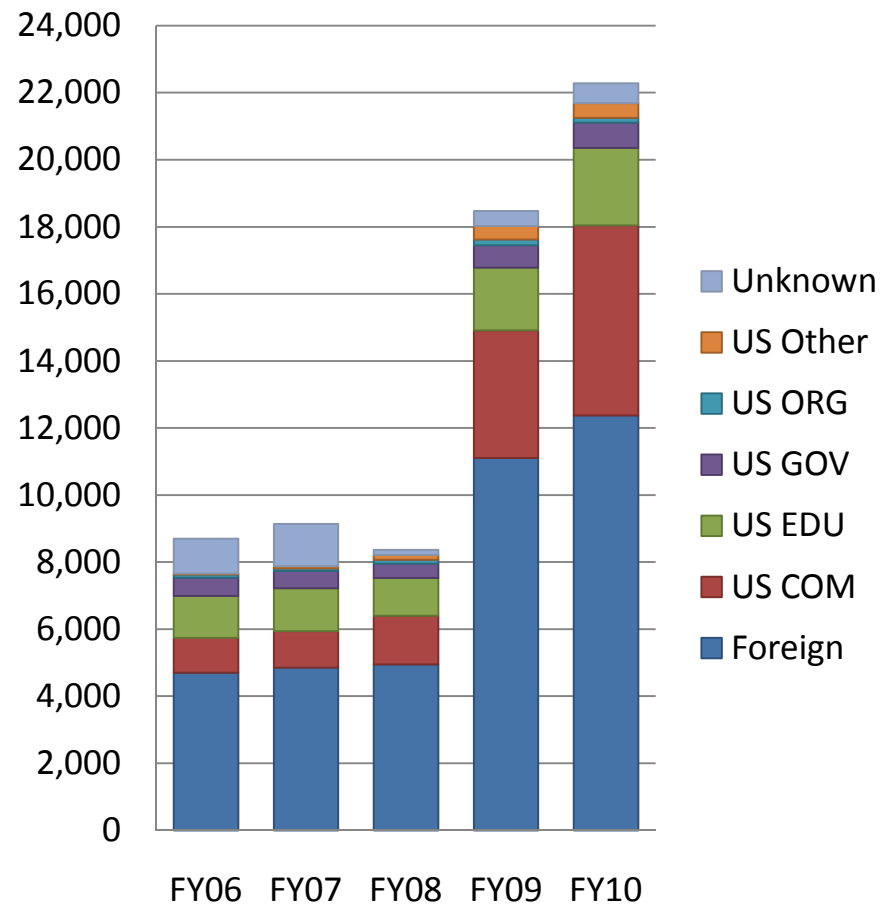


**Volume (TB) of L2-L4
Products Distributed from
ORNL by Domain**

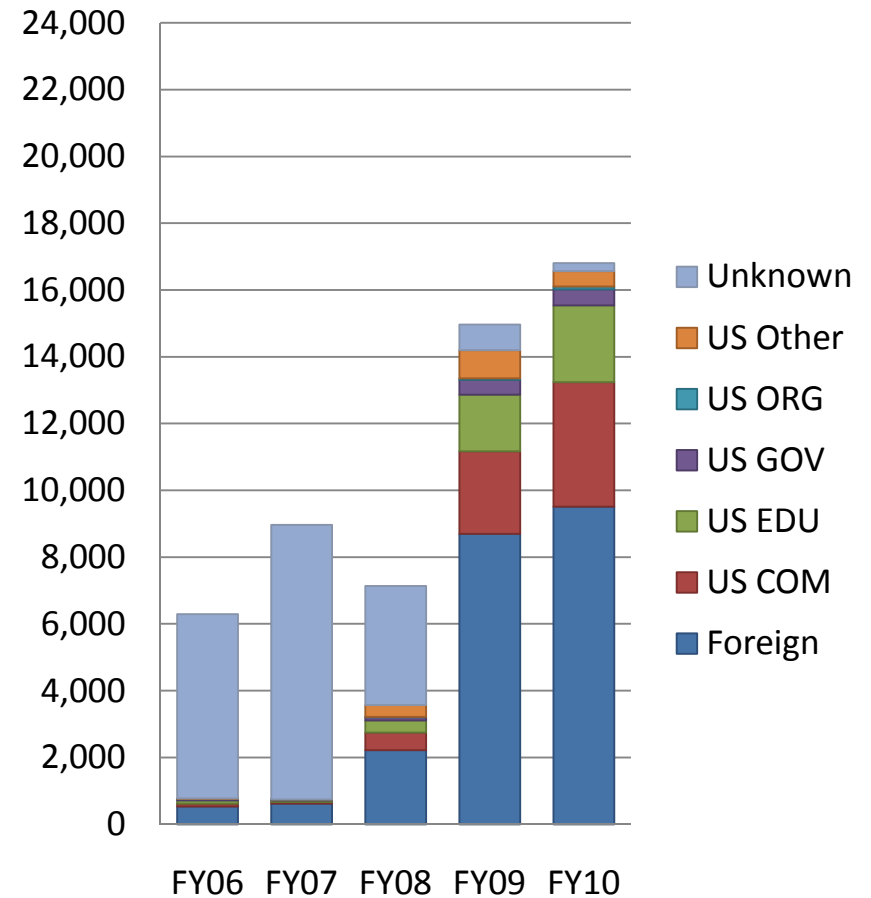




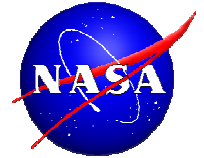
LP DAAC Users by Domain



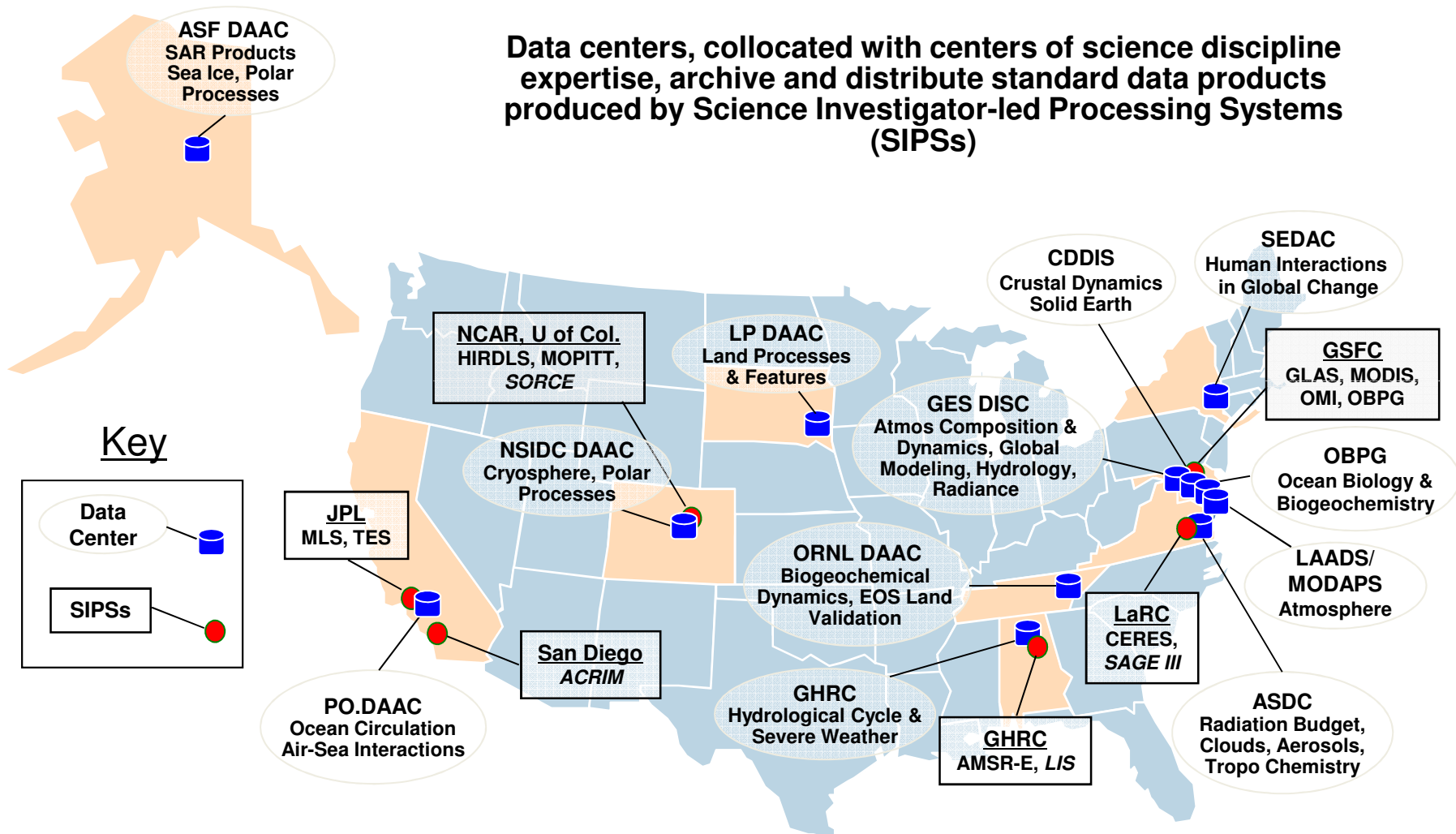
ORNL Users by Domain



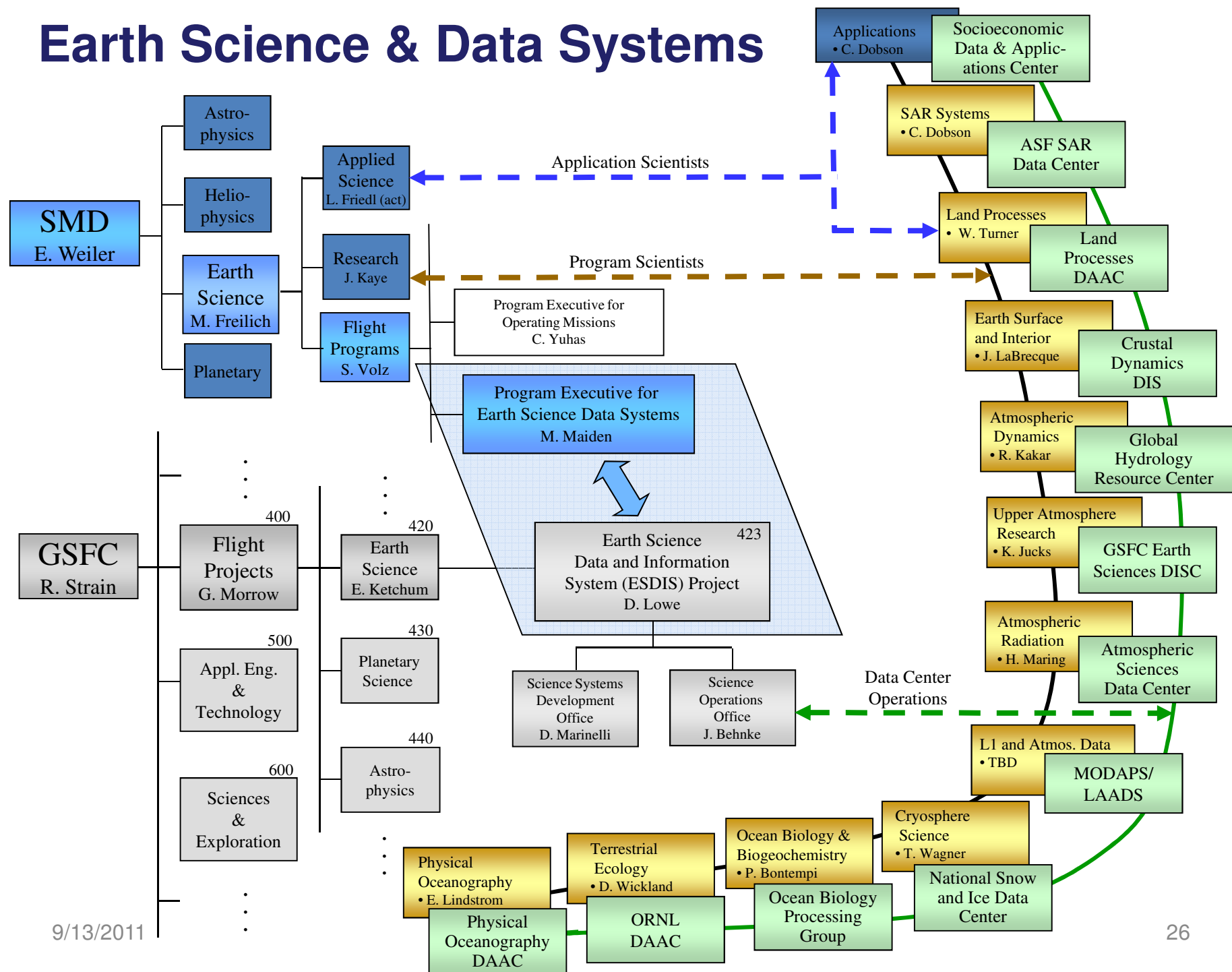
EOSDIS Facilities



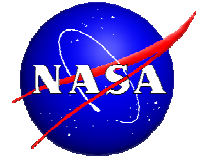
Data centers, collocated with centers of science discipline expertise, archive and distribute standard data products produced by Science Investigator-led Processing Systems (SIPs)



Earth Science & Data Systems

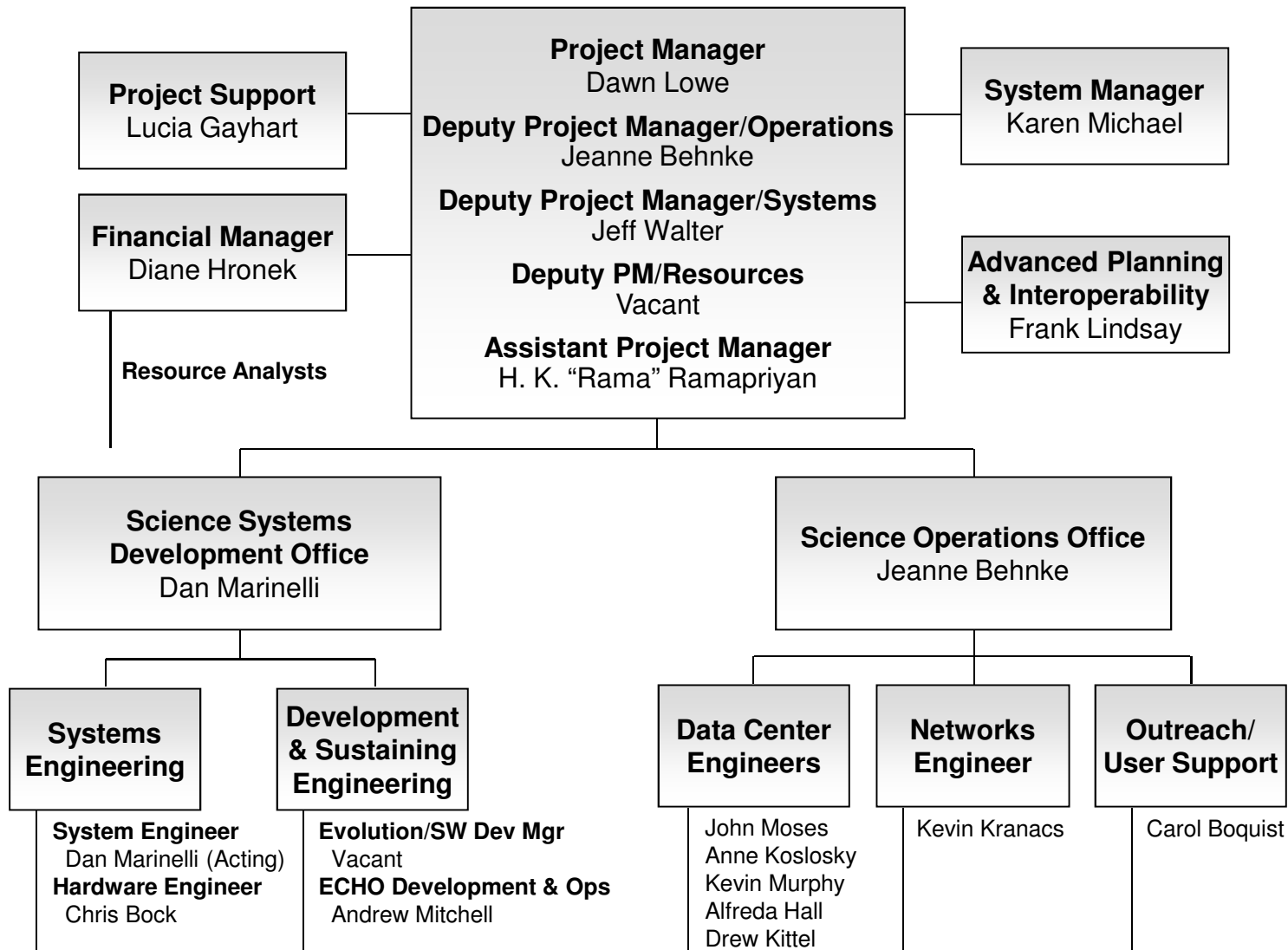
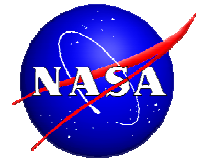


DAAC User Working Groups

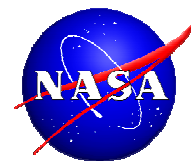


- Members represent discipline interests of the diverse user community.
- Purpose of the UWGs are:
 - provide guidance on DAAC data management priorities and science goals
 - provide oversight and guidance on DAAC activities, including data set acquisition, development of value-added products, user support, development activities, and operational functions
 - provide recommendations for annual work plans and long-range planning

ESDIS Project



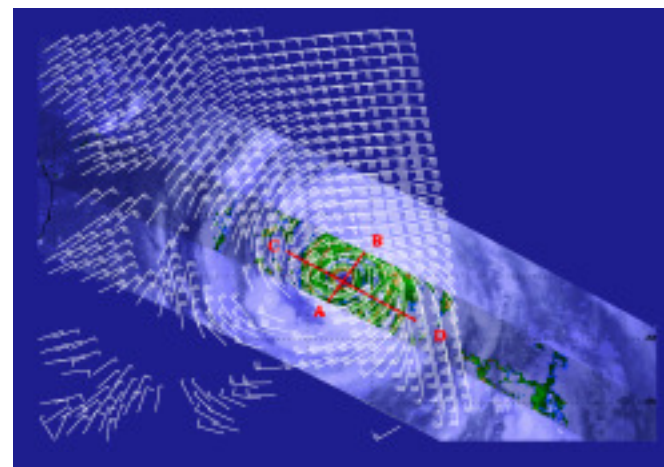
New Data Sets: MEaSUREs



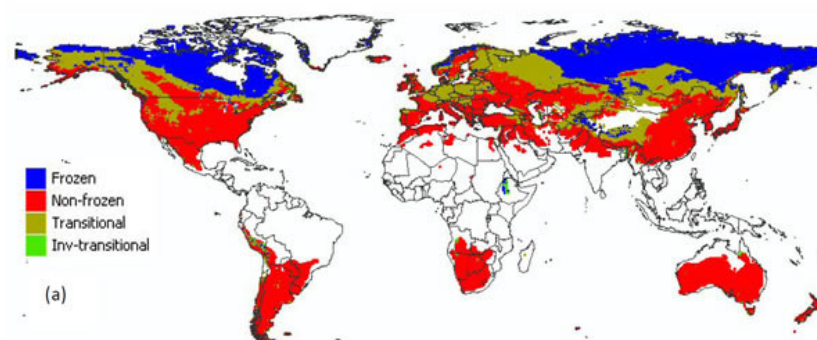
- MEaSUREs (Making Earth System data records for Use in Research Environments)

Cross-Calibrated Multi-Platform Ocean Surface Wind Velocity Data Set	PO. DAAC
Goddard Satellite-based Surface Turbulent Fluxes (GSSTF) Data Set for Global Water and Energy Cycle Research	GES DISC
Global Record of Daily Landscape Freeze/Thaw Status	NSIDC
Greenland Ice Sheet Velocity Map from InSAR data	NSIDC /ASF

— Already available at
EOSDIS DAACs:

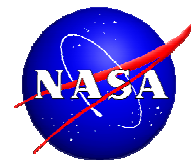


Ocean Surface Wind Velocity Dataset/PO.DAAC

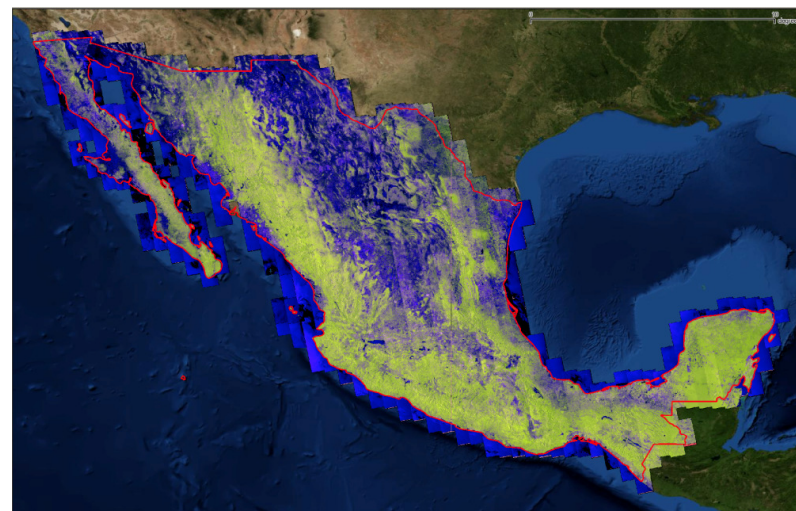


Freeze/Thaw Status at NSIDC

New Data Sets: ALOS PALSAR via NASA TDRSS



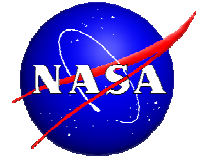
- PALSAR (Phased Array L-band Synthetic Aperture Radar) provides all-weather, day and night land observations. ScanSAR mode is useful for measuring sea ice and rain forest extent.
- NASA downlinks data via TDRSS Ka-Band from JAXA's ALOS to support NASA and JAXA research efforts.
- By combining NASA and JAXA data-relay satellite resources, coverage of North and South America nearly doubles.
- Over 51 Tbytes data now available from ASF Data pool.



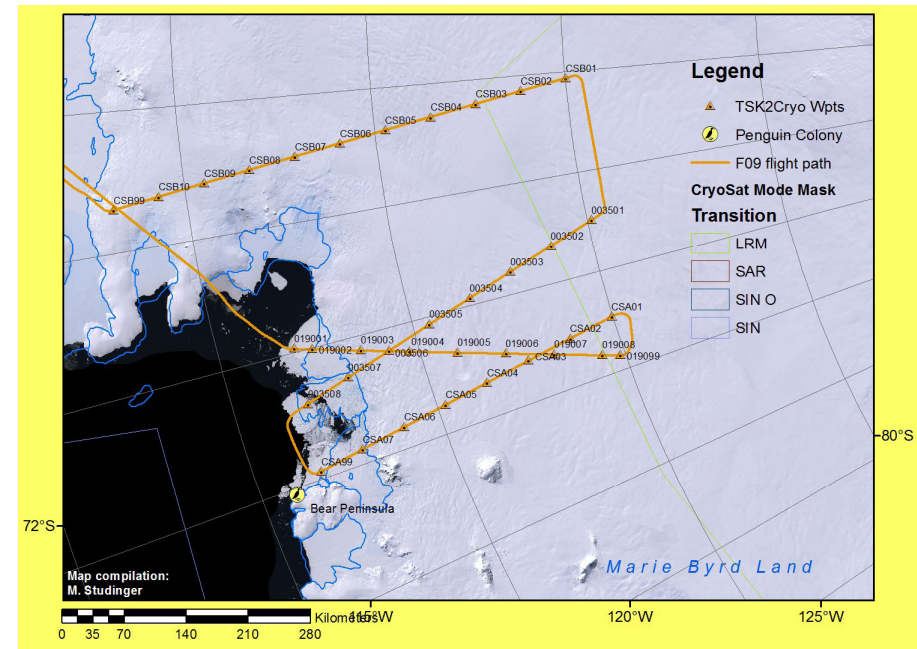
Mapping Mexico with ALOS PALSAR via TDRS/ASF DAAC
P.I. Josef Kelndorfer, The Woods Hole Research Center

- The **Pan-Tropical Mapping project** worked jointly with Mexico's ground data network of 40,000 permanent survey plots to generate a forest-cover product from JAXA's ALOS PALSAR data, acquired via TDRSS Ka-band services.

New Data Sets: IceBridge



- A 6-yr NASA airborne mission over Greenland and Antarctica
 - Cover gap between ICESat and ICESat-2; support CryoSat cal/val
- Archive and distribution of IceBridge products managed by NSIDC DAAC.
- 2009-2010 Greenland and Antarctica Campaign Data
 - Several data product types available online
 - Access will grow to include more than 20 major instrument types
 - All data will eventually be available within months of the campaign – immediately after



Flight path of 11/19/2010 low-altitude survey of two ICESat and two CryoSat ground tracks; a partial repeat of the 10/18/2009 IceBridge flight.